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EC59-709 Harvesting, Storing, Feeding Grain Sorghum.....

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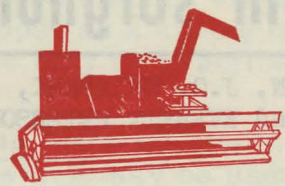
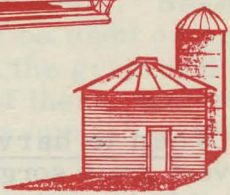
HARVESTING

STORING

FEEDING





Grain Sorghum.....

EXTENSION SERVICE
UNIVERSITY OF NEBRASKA COLLEGE OF AGRICULTURE
AND U. S. DEPARTMENT OF AGRICULTURE
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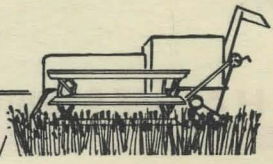
HARVESTING, STORING, and FEEDING grain sorghum



BY E.A. OLSON, J.C. SWINBANK,
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HARVESTING

When to harvest: The accepted practice is to harvest grain sorghum with a combine. It is important that this be done as soon as possible after the grain is mature. Greater field losses, because of lodging, can be expected when the harvest is delayed. Losses may be serious in the case of heavy winds or early fall snows if the crop is still in the field. The time of harvest and the procedure followed will depend on the facilities which the farmer has available.

Grain sorghum is mature when the seeds are fully colored and have begun to harden. At this stage they may contain 18 to 20 per cent moisture and harvesting at this stage with the grain being mechanically dried is recommended. Combining can start as early as 22 to 25 per cent moisture, but most operators prefer to wait until the moisture has dropped to 16 to 18 per cent. Twenty per cent is considered the maximum for combining grain sorghum which is to be used as seed.

If drying facilities are not available, the crop should be allowed to stand in the field until the grain moisture is 13 per cent or less for safe storage. Chemicals may be applied to the crop to stop further growth and hasten the field drying process. Otherwise, the crop must remain in the field until it is naturally dried to the safe storage level of 13 per cent moisture.

New growth in the fields may make it necessary to delay harvest until after a frost. A freeze of 27° or

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lower will kill the top growth and after a few days of good drying weather the moisture content should be low enough for safe storage--13 per cent or less. Spraying the crop with recommended chemicals will accomplish the same purpose as a killing frost. Because of cost the practice may be practical only for seed producers.

Chemical field drying for feed grain. Several chemicals are available which may be used on grain sorghum to help reduce moisture in the grain and dry the upper leaves and stalks. Some of these, however, are toxic to livestock and must not be applied on fields where the grain will be used for feed.

If spraying is considered necessary to dry grain sorghum that is to be used for feed, either magnesium chlorate or chlorate-borate mixture should be used.

Use magnesium chlorate at 5-6 quarts per acre if a liquid product is used or 20 pounds per acre if the soluble powder is used. Another product which can be used is a mixture composed of sodium chlorate and soluble borate. This latter chemical is usually referred to as chlorate-borate mixture. It should be used at a rate of 3 to 4 gallons per acre if in liquid form or 15 - 20 pounds per acre if the soluble powder is used.

Both magnesium chlorate and chlorate-borate are applied in water using as much volume per acre as possible. A good liquid detergent added at the rate of .1 to .2 per cent by volume will improve the wetting and spreading properties of sprays. On feed grain, spraying may begin when the moisture content reaches 30 per cent or less. Harvesting may begin 7 to 10 days after spraying.

Chemical field drying for seed production. The two most effective chemicals tested for drying grain that is to be used for seed have been pentachlorophenol (PCP) at 5-6 quarts per acre and dinitrophenol (DNBP) at 3 pints per acre. They should be diluted in No. 2 diesel fuel at a minimum of 5 gallons per acre if applied by airplane or 8 gallons per acre if applied by high clearance ground equipment.

PCP and dinitro are poisonous compounds and have label approval for use on seed crops only. Thus, they should be used only by the seed producer.

In hybrid sorghum production the spray should be kept off the male rows either by cutting them prior to spraying, or by using a directed spray that keeps most of the chemical away from the male rows. The male rows can be fed to livestock if the treated grain does not constitute more than 10 per cent of the total grain ration fed. Such an amount would be 200 or 300 times as dilute as the recognized poisoning level. The forage will be safe to graze 4 to 6 weeks after spray treatment. Both PCP and dinitro are somewhat repellent to livestock as indicated by actual grazing trials.

On seed production fields, spraying may begin when 90 per cent of the grain is well colored or after the moisture content of the grain reaches 30 per cent or less. Best results are obtained when clear weather and warm temperatures follow treatment. A period of 7 to 10 days should elapse between treatment and harvest in order to realize maximum benefit from the treatment. Harvesting should begin as soon as safe moisture is reached, however, regardless of time following treatment.

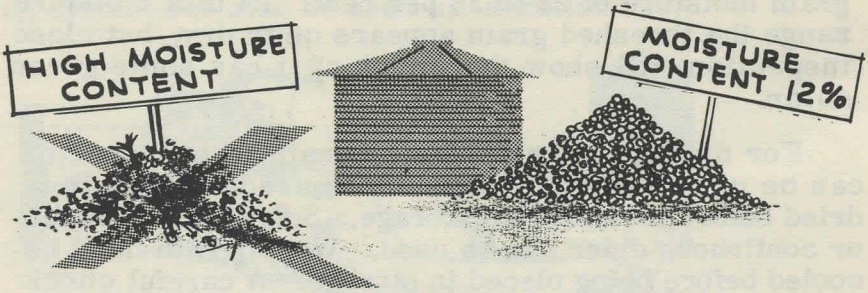
The magnesium chlorate or chlorate-borate mixtures mentioned for chemical drying of feed grains may also be used on seed production fields. Although these chemicals may be slightly slower acting for chemical field drying than the "penta" and "dinitro" products, their use makes it safe to graze the forage residue sooner or to feed the seed cleanings to livestock.

Operating the combine. Clean grain will result only if the combine is adjusted properly and run at an appropriate speed considering its capacity and the grain yield. Sorghum seeds crack easily. Therefore, the cylinder speed should be reduced below that used for wheat, but the rest of the machine should run at normal speed. All of the concave bars used for wheat may not be needed and the spacing should be increased.

To keep material from matting on the chaffer and sieves, the machine must not be overloaded and chaffer and sieves must be properly adjusted. If matting occurs, grain will be carried over the back end of the machine.

To avoid pieces of wet stalks in the grain, carry as little material as possible in the return. Carrying too much material will mean that some of it will eventually be broken into pieces small enough to go into the grain. Putting a piece of sheet metal over the chaffer extension may be necessary to reduce the amount of material going around in the return. Loss of a small amount of grain may be better than getting pieces of wet stalk in the grain tank. Where the grain from the combine can be run over a cleaner before storage, experience has shown that the moisture content is reduced 3/4 to 1 1/2 per cent.

The operator's manual for the combine gives recommended speeds and adjustments for cylinder, concaves, chaffer, sieves and fan. It also contains information on lubrication and maintenance. Careful adjustment and operation of the combine will help reduce the amount of cracked grain and foreign material. These materials restrict air circulation for drying. They may also lead to spoilage and insect problems.

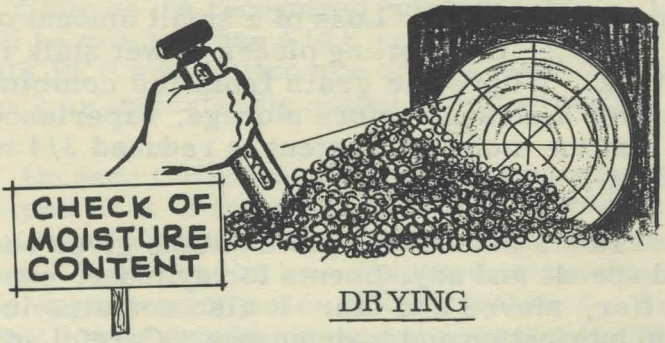


STORING

Grain moisture and cleanliness are perhaps the two most important factors to consider in storing sorghums. For best results, grain should be dried to 12 per cent moisture content or left in the field until this moisture level is reached. It must be 13 per cent or less to qualify for government loan.

Grain sorghum with a moisture content of 15 per cent generally can be safely stored until late March or early April. Such grain must be clean and will keep safely only as long as the storage temperature is below 50° F. In case the weather turns warm for several weeks during the winter, the grain should be examined for possible signs of heating.

Careful combining and cleaning of the grain will contribute to safe storage. Recommendations given under Operating the Combine above should be observed.



DRYING

Drying facilities will permit earlier harvesting of sorghums and thus help reduce field losses. Higher quality grain can be obtained by earlier harvesting. A combine will do a thorough job of threshing with a grain moisture of 22 to 25 per cent. At this moisture range the threshed grain appears quite dry, but close inspection will show that much of it has some green color.

For drying, either heated or natural air systems can be used. When heated air is used, the grain is dried before it is put into storage. Some form of batch or continuous drier can be used. Warm grain must be cooled before being placed in storage. A careful check of moisture content is advisable to insure that the grain has been dried to at least 12 per cent moisture. Temperatures used for drying with heated air will depend on the grain use. To prevent germination damage, seed grain should not be exposed to air over 108° to 110° F. Market grains can be safely dried with air temperatures up to 140° F. Feed grain can be dried with air temperatures of 160° to 180° F.

Natural air drying systems are also proving very popular. Storage bins can be adapted for drying with a lateral duct or perforated floor. Fans satisfactory for drying should deliver 3 cfm (cubic feet per minute) of air for each bushel of grain. To obtain this air flow through a 6 foot depth of reasonably clean sorghum, air must be delivered with a static pressure of 2 1/2 inches. If grain moisture contents are below 20 per cent, depths to 8 feet can be handled.

Time for drying will depend on the initial grain moisture content and weather conditions. Under normal conditions the grain should be dried in 10 days to 2 weeks. Operating costs for drying will depend on the initial moisture content of the grain. For natural air, operating costs may range from 1 to 3 cents per bushel and with heated air from 2 to 3 cents per bushel.

Aeration systems have proved beneficial for storing all farm grains. This is particularly true with grain sorghum. These systems provide a very small air flow of about 1/10 of a cfm per bushel. This small air flow will maintain a uniform grain temperature to prevent moisture movement within the stored grain. Aeration systems are not intended for use in drying grain. When heated air systems are used, an aeration system should be installed before grain is stored. A natural air drying system can also be used for aeration.

FEEDING

Pasturing Grain Sorghum Fields

There is generally no danger in pasturing livestock in grain sorghum fields except when there is new growth from drought-stricken or frosted plants. It should be safe to pasture livestock on fields after the heads have been combined for grain or harvested for silage. How-

ever, as a safety measure after a frost or freeze, the animals should be taken off the pasture until the leaves and stalks have been completely cured. The amount of prussic acid (a poisonous substance generally present in regrowths of drought-stricken or frosted plants.) is greatly reduced to a safe level after curing.

Feeding the Grain

Grain sorghums are nearly equal to corn in chemical analysis. They are a little higher in crude protein content, but much lower in carotene content. The energy content is nearly equal to that of corn.

When grain sorghums are to be used in any livestock or poultry ration, it is important to remember that this grain is very low in carotene content. For swine rations, and perhaps in poultry rations, it should be remembered that the lysine content is lower than that of corn.

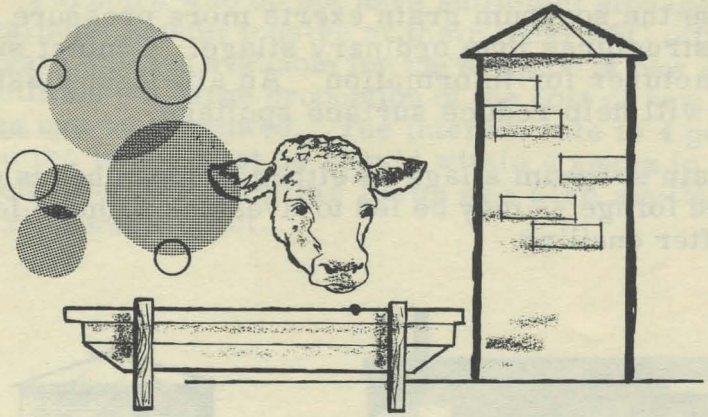
For beef cattle. Where beef cattle are to be wintered on rations consisting of 3 or 4 pounds of grain, grain sorghum is nearly equal to corn. The grain sorghum should be cracked or ground (medium texture).

Grain sorghums may replace all of the corn in cattle fattening rations. If cattle have been previously fed corn in their ration, a gradual change would probably help maintain the cattle on full-feed. However, new cattle just coming into the feedlot may be started out solely on grain sorghums for the grain portion of the ration. The grain sorghum should be cracked or ground (medium texture). In cattle fattening rations, grain sorghums are 90 to 95 per cent as valuable as corn. Generally, cattle will eat more grain sorghums than corn, and cattle fed on grain sorghum will produce carcasses comparable to those fed corn.

For sheep. Grain sorghums may also replace corn in fattening and wintering rations for sheep. It is generally not necessary to grind grain sorghums for sheep. Grain sorghums are nearly equal to shelled corn in feeding value for sheep.

For swine. The grain sorghums have 95 to 98 per cent the value of corn in swine rations. When growing and fattening pigs are self-fed, grinding does not usually increase its value enough to justify the expense. However, when the pigs are hand-fed, it would be advantageous to grind the grain sorghum.

For poultry. The grain sorghums are nearly equal to corn for poultry, when used in well-balanced rations. Ground grain sorghum can be used in poultry mashes in the same manner as ground corn, and the whole grain can be fed as part of the scratch grain.



MAKING AND FEEDING GRAIN SORGHUM SILAGE

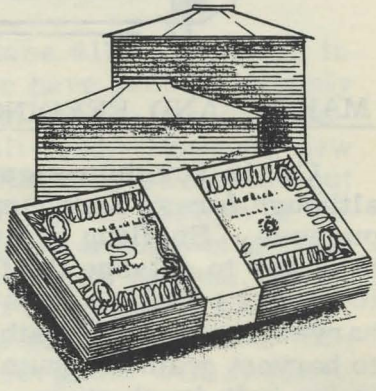
Grain sorghums can be made into good silage, although forage sorghums are usually planted for this purpose. Ensiling grain sorghums is considered the best way to salvage the feed value from fields that fail to mature before frost or in seasons when normal harvesting is not possible. The most desirable time to harvest grain sorghum for silage is when the grain is in the soft dough stage. This applies to making silage from either the entire forage or only from the heads.

The moisture content of chopped heads (ranging from 50 to 60 per cent) will be less than that of chopped forage when it goes into the silo. However, it is not necessary to add water in making silage from the immature heads. No preservative is necessary.

Grain silage can also be made from combined grain or chopped heads of more mature grain sorghum. Experiments indicate that the combined grain can be ensiled safely if the moisture content is above 21 per cent and care is taken to remove all the air pockets when filling the silo. The less the moisture content exceeds 21 per cent, the better the quality of the threshed grain silage.

Any type of silo may be used for making grain sorghum silage. If the silage is to be fed before next summer, temporary silos would be satisfactory. However, if silage is to be made from chopped heads, reinforcements must be added to concrete or tile silos because the sorghum grain exerts more pressure on these structures than ordinary silage. Contact silo manufacturer for information. An air-tight plastic cover will help reduce surface spoilage.

Grain sorghum silage -- either chopped heads or chopped forage -- may be fed to livestock within a few days after ensiling.



OBTAINING A FARM STORAGE LOAN

Loans can be obtained through local ASC offices on grain sorghums even though the farmer has not complied with his wheat acreage allotment. Farm storage loans range from 1.15 to 1.57 per cwt. in Nebraska.

In order to qualify for a loan, grain must be stored in an approved structure and must contain no more than 13 per cent moisture. Loans can be obtained any time up to January 31 after harvest. They mature March 31. If CCC cannot take delivery and the grain is stored on the farm for more than 60 days after this maturity date, storage payments of .082 cents per cwt. per day are made to producers.

Loans on commercially stored grain can also be obtained, provided that commercial storage space can be obtained.

Farmers who do not have sufficient storage space available should inquire at their local ASC offices in regard to loans available for the erection of new storage facilities. A large proportion of the cost of new facilities can be borrowed. The interest rate is 4 per cent and the loans must be repaid within 4 years in yearly installments. Similar loans are also available on drying equipment.

harvesting, storing, feeding

grain sorghum